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DOCKETED

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

Midway Manufacturing Company, :
a Corporation :
vs. :
The Magnavox Company, a :
Corporation and Sanders :
Associates, Inc., :
a Corporation :

74 C 1030
Civil Action
No. 74 Civ
1657 CBM

FILED

021-61578

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

The Magnavox Company, et al :
vs. :
Bally Manufacturing :
Corporation, et al :

Consolidated
Civil Action
Numbers
74 C 1030
74 C 2510

ERNEST W. NOLIN & ASSOCIATES
General Stenographic Reporters
369 ELGIN AVE., MANCHESTER, N. H. 03104
TELEPHONE: 623-6906

ORIGINAL

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA

Donald L. Nelson, Esquire and
A. Sidney Kitz, Esquire

Atari Inc., a Corporation

vs.

The Magnavox Company,
a Corporation and
Sanders Associates, Inc.,
a Corporation

For Magnavox Company:

Thomas A. Priory, Esquire

For Sanders Associates and

Magnavox Co. CA No.
C 751442 WTS

Don T. Williams, Esquire

Atari, Inc.:

Thomas O. Herbert, Esquire

For Sanders Associates:

Louis Ellinger, Esquire and

Richard I. Sericman, Esquire

Deposition of RALPH H. BAER taken by Subpoena and
notice at the offices of Sanders Associates, Inc., Daniel
Webster Highway South, Nashua, New Hampshire, on November 26,
1975, commencing at 9:45 a.m.

A.

Q.

A. I don't know of RALPH H. BAER I don't think I know him
called as a witness in behalf of Midway Manufacturing Company
and Bally Manufacturing Company, being first duly sworn, was
examined and testified as follows:

(Interrogatories by Mr. Welsh)

1 Q. I believe you stated that you placed the circle and
No. 5 within it on Exhibit 9, and the circle with
the No. 6 in it on Exhibit 20 sometime in 1974
when you accumulated these various items numbered
1 through 8. Was that the time when you placed the
other information on the front of the folder of
Exhibit 9?

A. I don't remember that.

2 Q. Do you recall with respect to Exhibit 22, which was
Item 8, and Exhibit 21, which was Item 7, those were
files in the same condition as when you found them
except for the numbers?

7 A. That's correct.

3 Q. But you don't recall when you put the information on
the front of Exhibit 9?

A. No, I do not.

4 Q. And how about the information other than the No. 6
in the red circle on the front of Exhibit 20?

A. I don't know as to what else. I can only guess that in the process of creating an orderly file I marked the file right about the same time as the numbers got on.

5 Q. Now, at the time in August of 1966 when the idea for TV games occurred to you in the east side bus station

A. in New York, and you stated that one of the motivations for it was the ubiquitous number of TV sets, Raster

10 Q. scan devices, and monitors, then you later became more specific as to what you meant by monitors and

A. Raster scan devices, did you at that time intend

11 Q. that the TV game idea be applied to monitors in

A. airports? state for a fact whether TV sets were

A. Not specifically. atal basis as they are today in

6 Q. Have you at any time since that intended that TV

12 Q. games be played on monitors in airports? ver?

A. Yes.

17 Q. When was that? elver?

A. Well, over recent years. It's become obvious that any public place is a suitable place for amusement

14 Q. equipment. I have that in mind at the time that you

8 Q. Well, now, I am speaking about the monitors which

A. you stated that were present in airports to provide

travelers with information about flight arrivals and departures, did you intend that those monitors be used for playing TV games?

A. No, sir.

Q. And how about the monitors, TV monitors, in hospitals around August, 1966?

A. Those that are used for patient entertainment certainly could be used for playing games.

Q. Were there monitors used for patient entertainment in the hospitals at that time?

A. I can't state that for a fact.

Q. I beg your pardon?

A. I cannot state for a fact whether TV sets were available on a rental basis as they are today in hospitals. I would be guessing.

Q. Well, now, the TV set, do you mean receiver?

A. Yes.

Q. A standard receiver?

A. Yes, standard receiver, or, ~~you know~~, a monitor ^a piped into [^] distribution system.

Q. You did not have that in mind at the time that you thought of the idea for TV games?

A. I don't recall, Mr. Welsh.

15 Q. And with regard to the Raster scan device, a scan converter, in August of 1966 did you contemplate that those would be used for playing TV games?

A. No, sir.

16 Q. Have you contemplated that at any time since?

A. No, sir.

17 Q. Now, referring, again, to a document marked 9-2 through 9-10 which was taken out of Exhibit 9 and which, as I understand it, is the first handwritten document prepared by you in connection with TV games, did you actually place the word started 1, September, '66, on page 9.2 on that date?

A. Yes, I did.

18 Q. Is it possible that you might have prepared this document at a later date but recalled that you had these ideas on September 1, 1966, and, therefore, placed that date as of the later date?

A. No, it is not.

19 Q. Referring, now, to page 9.3, would you read the information on that page above the line?

A. Yes. In the upper left-hand corner it says, "Witnessed and understood" in my handwriting followed by the signature, "R. M. Solomon, S-o-l-o-m-o-n,

2 September, '66." In the upper right-hand corner it says, "Page 104, R. H. Baer, 1 September, '66, and below that it says, "Background material - conceptual, TV Gaming Display.

Q. Who is R. M. Solomon?

A. R. M. Solomon at the time was an engineer in the electronic design department.

Q. Do you know his full name?

A. Robert M.

Q. Where is he now?

A. Mr. Solomon left the employ of Sanders, roughly

a year ago. As far as I know, he still resides in Nashua.

Q. Do you know whether he is employed now?

A. I don't know. I do not know.

Q. Do you know why he left Sanders?

A. No, he did not work for me or anywhere near my operation.

Q. Did he work for you in September of 1976?

A. He worked in my division.

Q. When did you hire him?

MR. ETLINGER: Could I ask you I don't recall. My recollection is that he had been to read back your question, please?
 at Sanders for at least a year or so prior to the 1966
 (The last question was read back

by the reporter.)

Q. Was he a personal MR. WELSH: Thank you, Mr.

A. Etlinger. I meant. 1966.

Q. (By Mr. Welsh.) In 1966 he worked in your division?

A. That's correct.

Q. What did he do in your division?

A. He was an electronics design engineer.

Q. Was he directly under you? Did you see Mr. Solomon

A. No, sir. Not basic outside of working hours?

Q. Was there a chain of command to him?

A. There were several levels of supervision between us.

Q. Did you have anything to do with him, directly, on a day to day basis?

A. Yes, I did. him alone or did some member of your

Q. In what respect? company you when you saw each other

A. To begin with, I hired him, so I knew him personally, and I sought him out to sign these papers.

Q. Yes? about how frequently around the September of

A. And certainly met periodically in project-related activities, meetings for project-related activities.

Q. When did you hire him?

A. I don't recall. My recollection is that he had been

A. at Sanders for at least a year or so prior to the '66

42 Q. date. --

34 Q. Was he a personal friend at that time?

A. Yes.

35 Q. Had you known him prior to the time you hired him --

A. No.

36 Q. -- at Sanders?

A. I had not.

37 Q. Around September of 1966 did you see Mr. Solomon on a social basis outside of working hours?

A. '66, yes.

38 Q. Prior to that time, did you see him on a social basis?

A. Probably.

39 Q. Did you see him alone or did some member of your family or his accompany you when you saw each other on a social basis?

A. Our mutual wives became friendly, also.

40 Q. And about how frequently around the September of '66 date did you get together with him on a social basis?

A. Not very often.

41 Q. About -- well, how often is not very often?

42 A. Maybe once in four or six weeks.

42 Q. And how long prior to that date did you start to
see him on a social basis?

A. I really don't remember, Mr. Welsh.

43 Q. Prior to the September 1st date, did you discuss your
idea for TV games with him?

A. No, sir.

44 Q. Where was Mr. Solomon on September 1, 1966 --
September 2 -- located physically in his work with
respect to where you were located?

A. He had an office in the same building on Canal
Street where my office was located.

45 Q. Was it on the same floor?

A. Probably. We moved a great many times since then,
Mr. Welsh.

46 Q. But you don't remember now?

A. '66, yes, both the labs and the offices, of
electronic design were on the fifth floor of the
Canal Street building at that time.

47 Q. Is that a large floor?

A. Yes, it is.

48 Q. Was his location on that floor close to yours?

56 A. If by close you mean within a hundred feet, yes.

49 Q. How far could your locations have been and still

remained on the same floor?

A. Roughly a thousand feet.

Q. Did you have an enclosed office?

A. Yes, I did.

Q. Did he work in an enclosed area?

A. He worked in a partitioned area.

Q. With other engineers?

A. I don't recall. Most likely, yes.

Q. Was Mr. Solomon a neighbor at that time?

A. You mean as far as his home is concerned?

Q. Yes. I'm sorry.

A. No, he was not.

Q. Was any member of your family related to any member of his family?

A. No, sir.

Q. At that time did you also see other employees of Sanders on a social basis?

A. Yes, I did.

Q. And did you see any others on a social basis who worked in your division?

A. Yes, I did.

Q. Any others whom you saw on a social basis working on the same floor as your office was located?

A. Yes, I did.

59 Q. Approximately how many were there?

A. Perhaps two.

60 Q. Any particular reason why you selected Mr. Solomon over other people including those others?

A. Normal reason, personal affinity.

61 Q. You stated that you made the entries on these pages 9-2 through 9-10 on September 1, 1966, the date which appears on certain of these pages next to your name. The date appearing next to Mr. Solomon's name is 2 September, '66. Is that the date when on which he signed his name on page 9.3?

A. That's right.

62 Q. Did you see him sign his name on that date?

A. Yes, sir.

63 Q. Was the written material on pages 9-3, 9-4, 9-5 and 9-6 on those pages at the time he signed page 9-3?

A. Yes, it was.

64 Q. Does his signature also appear on page 9-4 with the date 2 September, '66?

A. It does.

65 Q. Did you see him sign his name on that page on that date?

A. Yes, I did. I with a broadcast TV signal by

66 Q. His name also appears on page 9-5 with the date 2 September, '66. Did you see him sign his name on that page on that date?

A. Yes, I did.

67 Q. Page 9.6 also has his name with the date 2 September, '66. Did you see him sign his name on that page on that date?

A. Yes, I did.

68 Q. Did he appear to read the contents of these pages in your presence prior to signing his name on those pages?

A. Yes, the United States practices in this case --

69 Q. Would you now please read paragraph No. 1 on page 9-3?

A. "1. Intent: The purpose of ^{the} invention is to provide a large variety of low cost data entry devices which can be used by an operator to communicate with a monochrome or color TV set of standard commercial unmodified type. Entry into the TV set is to be gained either through direct connection to the video system (at the second detector) or by

A. connection to the antenna terminals ~~found~~, thus

70 Q. substituting the entire device (herein after called

'generator') with a broadcast TV signal by modulating an R.F. oscillator operating on one of several standard TV channel frequencies, and tuning the TV set to that channel. (Channel L.P. underlined for let's play.)" copy of some TV set.

70 Q. When you use the terms monochrome or color TV set of standard commercial unmodified type, that did not include monitors, did it?

A. By that I mean, Mr. Welsh, a Raster scan device in which such things as the scan rate, horizontal and vertical scan rates, frame rates, haven't changed. It is a device which you could enter -- the device of common United States practices in this case -- which you could enter with a standard composite signal.

71 Q. Did you mean a home television receiver?

A. I meant what the two words say, Mr. Welsh.

72 Q. Standard commercial unmodified type?

A. Broadcast receiver which could be entered either at the antenna or at the beginning of the video chain.

73 Q. But at that time did you contemplate home television receivers?

A. The answer is yes, either by connection to the

74 Q. You intended a game that could be played in the

Q. home, did you not?

A. I can't answer that yes and no, Mr. Welsh. I intended a game. A major attraction to me of the invention was the home application, clearly, because of the multiplicity of home TV sets.

Q. The ubiquitous number?

A. The ubiquitous number of TV sets. But, clearly, ^I it was careful to point out that that characteristic which makes a TV set different from a monitor, namely, the presence of an R.F. front end was, not a necessity for playing games on a screen of a set. ^{You may} They call it a TV set or a monitor. I have never made that distinction.

Q. Did you find anything in paragraph 1 which indicates that you intended the TV game idea to be applicable to any type of Raster scan device without an R.F. section? push buttons, variable controls, light

A. Yes, I do, yes, typewriter screens.

Q. What's that? card used with the screen?

A. The words "entry into the TV set is to be gained either through direct connection to the video system

(at the second detector) or by connection to the antenna terminals, etc." a similar explanation is

- 78 Q. That was video system of a standard commercial unmodified type of monochrome or color TV set, isn't it? ~~job by working around~~
- A. That's correct.
- 79 Q. What is a data entry device as you use the term in paragraph 1?
- A. Any electronic black box capable of entering signals, such as a command, into a display device such as a Raster scan C.R.T.
- 80 Q. What data entry devices were available at this time, the 1st of September, 1966?
- A. I don't understand the question.
- 81 Q. What types of -- what data entry devices were you familiar with as already in existence as of that date?
- A. Well, data entry devices and display systems clearly include push buttons, variable controls, light pens, photo pens, typewriter keyboards.
- 82 Q. Was the keyboard used with the Saturn V display ^a data entry device, as the term is used in paragraph 1 here of page 9-3?
- A. No, it was not, and I say that because I believe I previously went through a similar explanation in.

which I indicated that keyboard entry devices such as the typewriter keyboard on a Saturn V job does its job by working through digital interfaces communicating with a processor, computer, which, in turn, energizes another block in the system which may turn out to be the character generation which comes out on the screen. There ^{are} ~~is~~ a great many intermediate steps which cause a series of manipulations in the system that happen either automatically or on the basis of pre-programmed inputs which are not necessarily directly related to pushing a button or turning a knob or using a photo pen. I distinguish between that and turning a knob or pushing a button and getting an immediate result.

83 Q. Well, there must be something in addition to the knob or the button.

A. Well, certainly, ^{there} ~~this~~ is certainly associated circuitry. ~~and the activities which~~

84 Q. Did you not get an immediate result upon pushing a button on the Saturn V keyboard?

A. In most cases, that to get

85 Q. So the data entry device for the Saturn V display included these other parts you named in addition to attaching a wheel to a potentiometer which would

the keyboard? It's in a circuit connected to the

A. Yes, it does. ~~working at the computer~~

86 Q. K: Would you now read paragraph 2 through sub-
paragraph A on page 9.3?

90 A. Yes. "2. Some classes of games considered; the
following general classes of games are presently
visualized. A. Action games in which skill of the
operator (observation, manual dexterity) play a
part. For example, steering a wheel to control
91 random drift of colors. (Hue over the C.R.T. screen
face phase.) Timer determines which participant (herein-
after called player) can maintain a particular hue
longest, etc." I'm sorry, Mrs. Welsh. Do you want
me to go on?

87 Q. No, that is through A. That's exactly what I asked
for, did you contemplate when you wrote this
paragraph? Did you contemplate any specific
means by which the activities which you've just
stated would occur?

A. Yes, I did. how rapidly you turn the wheel

88 Q. Did you reduce that to writing?

A. Not at this time. MR. WALSH: Would you read the

89 Q. What means did you contemplate at this time?

A. Attaching a wheel to a potentiometer which would

vary phase shifts in a circuit connected to an ~~ack~~ by
oscillator operating at the chrom^a frequency of a
color television system so as to produce a variety
of output hues.

Q. What did you contemplate that the viewer would see?
Would you contemplate -- strike the first part -- he
would see anything on the screen of the television
receiver? turn the wheel.

A. Yes.

Q. What did you contemplate that the player would see?

A. A variety of colors.

Q. The entire screen being of one color and then of
another and then another, is that what you
contemplated?

A. No, sir. It wouldn't; couldn't work that way.

Q. What did you contemplate when you wrote this
paragraph? the vertical bars in there -- then you

A. In effect, a series of bars, horizontal bars whose
width and change in hue from bar to bar ^{it} would be a
function of how rapidly you turn ^{ed} the wheel ^{and} phase
^{pots.} shift ^{parts} turning down.

Q. Did you contemplate MR. WELSH: Would you read the
last answer back? to the right?

Yes. (The last answer was read back by the reporter.)

94 Q. (By Mr. Welsh.) Did you contemplate that the wheel would be turned in one direction or more than one direction?

A. More than one direction.

95 Q. What did you contemplate to happen if the player did not turn the wheel at all?

A. A full screen fixed color would be visible on the C.R.T. and color would remain on the

96 Q. What did you contemplate to happen if he turned the wheel to the left?

A. Change in the color of the entire screen.

97 Q. Of the entire screen?

A. No, we went through that, Mr. Welsh. If the part

98 Q. were moved slowly enough -- by slowly, I mean with respect to the vertical scan rate -- then you would get gradual changes of color on the entire screen. Turning the wheel rapidly, it would change and form bars, because it would be changing color while you are scanning down.

Q. Did you contemplate the same thing to happen if you turned the wheel to the right? frequency of a

A. Yes. ... calculator, that is, an oscillator running at

Q. So it made no difference whether you turned the wheel to the right or left, but only how fast you turn the wheel?

A. No, because going in one direction you go towards the red end of the spectrum, and in the other direction you go towards the blue end of the tri-color spectrum.

Q. I believe you stated if the player didn't turn the wheel at all, a solid color would remain on the screen?

A. That's correct.

Q. Is that color -- would that solid color be considered a particular hue?

A. Yes, it would.

Q. There's indicated a timer determines which participant can maintain a particular hue longest. So if you didn't move the wheel at all, your hue would remain the same until it was moved. Could you explain, if that statement of mine is in error, how do I misunderstand it?

A. You are correct, and that refreshes my memory. What I had intended was the change of frequency of a

chromaoscillator, that is, an oscillator running at roughly 3.58 megacycles with the control connected to the steering wheel. That makes it a good deal more difficult to maintain a color, constant color, up there, because, normally, to get constant color you need crystal controlled accuracy, stability, and it is the deviation from precise frequency (that generates colors, and that's what made it a game of skill) with respect to that and makes it difficult to maintain colors, and, therefore, allows you to create a game, competitive game, in which two people pit their skills for maintaining a color on a screen against each other.

103 Q. Well, if the color wouldn't vary if the wheel weren't turned at all --

A. Yes, it would, because the oscillator, an L.C. or R.C. controlled oscillator at 3.5 megacycles does not stay within a few cycles for any length of time. It drifts and that automatically produces color changes.

104 Q. Does it drift on a regular basis or on the same recurring basis?

A. No, sir, it would drift randomly.

105 Q. So that one player wouldn't necessarily have the same drift to adjust for as the other, is that correct?

A. No, the odds might be different in each case.

MR. HERBERT: Could you repeat that?

THE WITNESS: The odds might be different in the sense that with whatever thermal effects or other factors cause drift of an oscillator relatively at random.

106 Q. (By Mr. Welsh.) If it were random, would it be possible for a player to develop a skill in adjusting to the changes of the oscillator due to drift?

A. Yes.

107 Q. Even though it was on a random basis?

A. Yes, although it is random, it still is a continuous phenomena since you don't discreetly hop from one frequency to another, you drift, and, therefore, colors change as a function of how rapidly you drift.

108 Q. What did you contemplate to determine when the screen would no longer display a single color but would have a series of horizontal bars whose width and hue would change?

A. What did I contemplate doing, Mr. Welsh?

any have... if MR. WELSH: Could you read the question?

... (The last question was read back by the reporter.)

... THE WITNESS: It is clear from the process of recollection we just went through that that was not the intent. The intent was to maintain a solid color up there and that that was the game.

109 Q. (By Mr. Welsh.) I'm sorry. I didn't understand that you had excluded the bars.

A. Well, the bars are still there, Mr. Welsh. If the drift is great, drift rate is large, or if you turn the wheel rapidly, there will be bars there, but in recollecting just what I was thinking of at the time, the bars were not meant to be a part of the game. The whole game was to prevent bars and keep a solid

color up there.

110 Q. Do I understand correctly what you said before about having a series of horizontal bars width and hue

A. changing depending on how rapidly you turn the wheel

phase shift parts was not accurate? and it.

A. The bars would still occur, as I just stated a minute

ago, if you turned the part rapidly. But the part

"pot"

*

may have been a frequency determining element rather than a phase shift element. The effect is the same.

111 Q. It may have been a frequency determining element. What did you contemplate? I believe you stated you contemplated a phase shift.

A. Yes, I think that is incorrectly phrased. A part was used in connection with the wheel was a frequency determining element, but nothing here says that it had to be a ^{"pot"}part. It could have been a variable capacity, too.

112 Q. Well, was your earlier testimony correct or not?

A. It was not when I first recollected that I used ^athe phase shift ^{"pot"}part. I believe I said that it was incorrect, that what was intended was a change of frequency shifted hue, not a change of ~~frequency~~ phase shift.

113 Q. Well, was it also correct with respect to the bars changing in width and hue depended on how rapidly you turned the wheel?

A. Yes, that would still occur.

114 Q. The object was to avoid bars, as I understand it?

A. That's correct.

115 Q. How do you control drift of color, by changing the

phase or the frequency?

A. In practice it works out that you can cause a color receiver to display different colors both ways, both by shifting the phase of a chroma signal with respect to a chromaoscillator in every color demodulator of every color set, or by shifting frequency.

MR. WELSH: May I have that answer back, please?

(The last answer was read back by the reporter.)

116 Q. (By Mr. Welsh.) By shifting frequency of what?

A. Of the chroma frequency signal applied to the video circuits and ^{chroma} control or demodulator circuits.

MR. WELSH: Let's take a few minutes break.

(Whereupon, at 10:40 o'clock, a short recess was taken.)

A. No. Can I point out that I have been in the radio business since before I was in the electronics, and it was characteristic of every radio receiver to have a phono jack in the back in years gone by, and, to be, it is still amazing that to this day

AFTER RECESS 11:15 P. M.

back, which is a video jack, because I don't want

117 Q. (By Mr. Welsh.) Mr. Baer, when you had your idea
for playing games on television sets, did you also
consider the possibility of playing games on other
types of C.R.T. displays?

A. Yes, clearly, monitors.

118 Q. Monitors with Raster scan?

A. Yes. My definition of a monitor, of a TV monitor,
is a TV set without the front end.

119 Q. Was that your definition at the September, 1966, date?

A. Yes, it always has been.

120 Q. Did you consider playing games on any other type of
C.R.T. display?

A. I don't recall.

121 Q. Did you at this time in August or September of 1966
have any writing which indicated that definition of
monitor which you just gave me?

A. No. Can I point out that I have been in the radio
business since before it was called electronics,
and it was characteristic of every radio receiver
to have a phonograph jack in the back in years gone
by, and, to me, it is still amazing that to this day

every TV set does not have a phonograph jack in the back, ^{that} which is a video jack, because that would immediately make every TV receiver into a video monitor. That's certainly -- I am certain is ^{that} _{what} was on my mind when I talked about entering into the video directly at the time.

122 Q.. At that time around August and September of 1966 did you consider that there was an advantage in playing games on Raster scan devices as contrasted to other types of C.R.T. displays such as random access?

A. Yes.

123 Q.. What were those advantages?

A.. Because of the general availability of Raster scan TV type devices and the virtual non-existence of random access devices except in specialized highly technical systems, boards, and the like and the

124 Q. Other than the availability of a large number of TV receivers, was there -- did you see any advantage in playing games on Raster scan devices as contrasted to random access devices? we talked about, "Low

A. I am certain. I didn't even give that a thought,

A. simply because it didn't correspond to the realities. You cannot play games on a device that nobody has.

125 Q. Now, when we were discussing paragraph 1 on page 9-3, which was part of Exhibit 9, I believe it was stated that data entry device for the Saturn V system included several things in addition to the keyboard, and one of those -- was one of those the data processor? itself. So the

A. No, sir. ^{or} Data process[^] is not a data entry device. *

126 Q. And did you not intend to include as those parts needed with the keyboard for data entry to include the data processor in the Saturn V system, is that correct?

A. I don't believe so, Mr. Welsh.

127 Q. Could you correct me, then?

A. Yes, I tried to make a distinction between the function of the data entry device, such as the push-buttons, keyboards, and the like and the control. In this case, the part, I believe, we talked about in connection with paragraph -- couldn't have been paragraph 1. The distinction

128 A. I believe the second line we talked about, "Low cost data entry devices." as compared to digital

A. I'm getting confused, Mr. Welsh. At one point I

A. I drew the distinction between the data entry devices

on the Saturn V job as being directly linked to what appears on the screen by virtue of the fact that there is a whole intervening series of equipment, such as the ^{digital} timing interface, the processor, the character generator between those data entry devices and the display, itself. So that pushing a button, for example, doesn't necessarily, by itself, result in some action. It may only command an action that something else executes.

Q. Well, did you contemplate in your low cost data entry device referred to in paragraph 1 of Exhibit 9-3 that you would not also have something between whatever control devices were manipulated by the player and the actual display?

A. No, we addressed that before, Mr. Welsh, and the answer is: certainly there is circuitry in between the control and the display.

Q. Did you contemplate that there would be a data processor between the control and the display?

A. No, contemplated entering up on the screen symbols that

Q. Did you contemplate analog as compared to digital entry? Symbols on the screen through manual controls.

A. No, did you contemplate putting the image of a board,

132 Q. You contemplated digital entry?

A. Yes. In this day and age, you cannot make that kind of distinction.

133 Q. How about at the day and age around August and September, 1966?

A. Same comment applies, Mr. Welsh.

134 Q. Did you contemplate a digital interface between the control and the display?

A. No.

135 Q. Would such an inter^{face}phase have been needed if you had contemplated a digital entry?

A. Yes.

136 Q. Going, now, to paragraph B of section No. 2 on this Exhibit 9-3, would you read what is stated there?

A. "B. Board skill games: i.e., classes of games imitative of checkers, chess, dominoes."

137 Q. Would you describe how, as of that time, 1 September, '66, you contemplated that checkers would be played, for example?

A. I contemplated putting up on the screen symbols that would be imitative of a checker and manipulating those symbols on the screen through manual controls.

138 A. Q. Did you contemplate putting the image of a board,

checkerboard on the screen? ²blinking, color coding of

A. We contemplated putting simple horizontal, vertical lines on the screen which would be imitative of an eight by eight checkerboard.--.

139. Q.. How did you contemplate doing that? ~~not~~ ^{not} generating

A. Through generation of the proper unblanking signals, say, of the vertical and horizontal sinc.

140. Q.. And how did you -- by what means did you contemplate providing for that?

A.. I am not certain, Mr. Welsh, whether it was on this early date or within the next two or three days that the ideas of using other forms of delay generator ~~stern~~ came into being. I think we'll come to them very soon. I'd be more at

141. Q.. I am speaking as of this date when you --

A.. I do not recollect precisely what was in my mind.

142. Q. Is there anything in this document that indicates how you contemplated doing that or what means you intended to provide to do that? contemplate putting

A. There is, later on, Mr. Welsh, in section 33 on page 9-6 do not remember that.

143. Q.. Would you read that section 33? ~~checkers?~~

A.. Section 33 says, "Bar, line, or dot generation.

Players control selective ^ablinking, color coding of lines, bars, dots, fields by a generator (B, C, D and E.) "B, C, D and E referred to the sub-headings of paragraph 2 on 9-3 and 9-4.

Q. Does that include how you contemplated generating bars and lines or a dot?

A. No, it only proposes to do that. -- did they differ

Q. Did you have in mind generation of more than one

A. horizontal line --

A. Yes, and you stated that they would be --

Q. -- at that time? Of fact, Mr. Weisen, a whole series

A. Since we talked about generating checkerboard patterns.

Q. Did you contemplate that the checkerboard pattern would be moveable? All checkerboard patterns would be

A. No, sir. -- on the screen.

Q. You stated that you contemplated putting on the screen

A. symbols imitative of checkers? -- by overlays to be

A. Checkers: the exterior of the cathode ray tube.

Q. How many such symbols did you contemplate putting on there? 1, 1966, when you prepared this document,

A. I do not remember that. -- number of symbols

Q. How many -- have you played checkers? -- or

A. Yes, contemplated using?

151 Q. How many checkers are needed to play a checkers game?

A. Sixteen on each side, as which you've noted in

152 Q. Did you contemplate having thirty-two symbols of
checkers on the screen? - as to a situation.

A. Certainly not. I believe the words were imitative
of checkers and chess. ^

153 Q. Well, how, if they were imitative -- did they differ
from checkers?

A. Yes, you did not consider any more than 16 squares

154 Q. How did you contemplate that they would differ?

A. Well, as a matter of fact, Mr. Welsh, a whole series
of games did eventually evolve, as you will see, in
which either one or two symbols are moved about in
what I chose to call checkerboard fashion because of
the checker squares ~~is~~ on the screen. ^

155 Q. Checker squares generated on a cathode ray tube?

A. No, not on the cathode ray tube, by overlays to be
placed on the exterior of the cathode ray tube.

156 Q. Confining ourselves, still, to the time of
September 1, 1966, when you prepared this document,
did you have any particular number of symbols

161 A. imitative of checkers which you expected or had in
contemplated using? - as to a board skill game

A. No, I did not.

157 Q. How about the chess game which you've noted in paragraph B of Section 2 on page 9.3?

A. It was an optimistic approach to a situation. Certainly, with a little creativity, one could generate a chess game in which only two figures participate, because that's generally what you wind ^{up} ~~out~~ with at the end of a chess game. *

158 Q. So you did not contemplate any more than two figures or two symbols imitative of chess players?

A. Probably not, but I cannot specifically answer that.

159 Q. Have you ever carried forward with the idea you had in mind on September 1st of generating simple horizontal and vertical lines on the screen to form the checkerboard?

A. No.

160 Q. Turning now to the domino game, how did you contemplate that that would be played?

A. Again, we referred to a simulated domino game. Probably, the most accurate answer at the moment

is that I don't remember what I was thinking of.

161 Q. Do you recall whether you had something specific in

A. mind or you just included that as a board skill game

because it was a game somewhat similar to chess or checkers?

A. I think it is correct to say that any board game which can be simulated by symbols involved that came to mind at the moment I wrote this paper got included.

162 Q. You don't recall anything specific that you had in mind?

A. No, sir.

163 Q. Dominoes, really, isn't a board game?

A. Well, it isn't. It is not a board game, but it is a geometric game in which pieces are laid side by side and stacked up.

164 Q. That's not necessarily in a regular pattern.

A. No.

165 Q. In fact, it usually changes from one game to the next, doesn't it?

A. That's correct. That's why it is possible to visualized moving spots about the screen, stacking them with respect to each other, side by side.

166 Q. In fact, you could play a dominoes game on any flat surface, can you not?

A. Right.

167 Q. Without any marking such as checkerboard pattern or anything else? ~~under the board that was used for~~

A. That's right. inspection of the models. I don't

168 Q. Would you now read paragraph C under Section 2 on page 9-3? ~~of the timer that was used for the timer.~~

A. "C. Artistic games in which the player manipulates controls to produce artistic designs, working against time (integral timer.)" ~~on the shelf~~

169 Q. What do you mean by integral, or what did you mean by integral timer? this model which you have

A. Built-in, say. In those days it would have been a semi-conductor timer. timer on it?

170 Q. Built into what? ~~into the second part.~~

A. Built into the hardware, into the electronic hardware constituting the game electronics, which, in fact, we did. which we built, and among other things,

171 Q. When did you do that? ~~pushing game in which a~~

A. Some of the very first hardware we built had built-in timers to time game functions. ~~was the timing~~

172 Q. I expect that we will discuss that specific hardware

173 Q. later. I understand it is still available.

A. The hardware is in this room, and the documents are in front of us. into the circuit -- by a toggle

173 Q. Could you refer generally to it at this time and
tell us which model or models that was used in?

A. Well, only by inspection of the models. I don't
recall -- there are quite a few -- whether it was
the second or the third model that had the timer.
I can point to it, physically. partitions labeled?

174 Q. Would you do that? It has a switch called the timer.

A. Yes, it is the third one from the right on the shelf
near the window.

175 Q. Would you describe this model which you have
selected as the one about which you were speaking
that had an integral timer on it? It was the third.

A. As the label indicates, that is the second unit.
It is identified as No. 2.

176 Q. That's a label with a No. 2, a masking tape label.

A. Right. Which we built, and among other things,
we were able to play a pumping game in which a spot
was pumped up in a vertical direction or down,
depending upon how rapidly you move the pumping
handle.

177 Q. That handle is a part of that model? And, below the

A. That's correct, and a built-in timer which is right
controlled -- put into the circuit -- by a toggle.

switch at the north end of the chassis.

178 Q. Or top portion. Does it have a chassis with a horizontal surface on top?

A. Yes, it does.

179 Q. Is there a switch there that has different positions at the top with the different positions labeled?

A. Yes, there is. It has a switch called the time-mode switch.

180 Q. And what are the different positions?

A. There are pencil markings, Mr. Welsh. I think, to refresh my memory, that switch was used to play three different games, one of which was the chess game, and a fox hunt; the other one a target-shooting game, and the third position is marked, is used, as a fireman's game. *

181 Q. Are there labels for different positions of the switch?

A. Yes, they are pencilled in lightly.

182 Q. Are there other labels surrounding the switch?

A. Yes, there are.

183 Q. What are those labels?

A. Above the switch, the label is delayed, below the switch the label is instant, to the left and right there are the labels which together spell out the

word time-mode and identify the function of the switch.

184 Q. O. K. I think we can leave that at the moment and go back to the other document which has been marked as an exhibit.

In paragraph C of Section 2 it refers to artistic games in which the player manipulates controls to produce artistic designs working against time. Now, after that it indicates in parentheses integral timer. You noted that a timer was incorporated into the model which you just pointed out to us. Would you now tell us what, as of 1 September, '66, when you prepared this document, what artistic games you contemplated?

A. Yes. I was thinking of allowing vertical and horizontal unblanking signals to drift with respect to true vertical and horizontal ^{sync} sine and in that fashion create, well, the equivalent of ^{Lissajou's} lissagous figures, moving lines, bars. I was also thinking of allowing the chroma oscillator to drift and produce different hues for use with a color TV set.

185 Q. What are lissagous figures? ^{moving} lissagous patterns

A. Lissagous figures in oscillography, ^{or} use of an

oscilloscope, are the geometric figures created on the screen by the application of wave forms ^{to} ~~through~~ the X and Y axis which may differ in frequency ~~say~~ from one another. As an example, if any frequency F is applied to the X axis and the frequency $2F$ is applied to the X axis ~~to~~.

- 186 Q. You mean Y? ~~template~~ that this came ^{sinusoidal}
- A. I'm sorry. And both signals are ~~spheroidal~~ in shape, the figure 8 (in a vertical direction) will show on the screen. As soon as one of these two frequencies drifts ^{off} ~~over~~, that figure will begin to tumble and change and produce a multiplicity of patterns on the screen that are very pleasing to look at and artistic, by my definition. ~~... on 2 on~~

- 187 Q. What did you contemplate a player would do to play the games which you indicated as artistic games in paragraph C? (Basic arithmetic (adding blocks).)"

- A. Manipulate the rate^a of vertical oscillator running near vertical frequency and an oscillator running near horizontal frequency, but not on either of those frequencies, to control the difference between the frequencies so as to make pleasing looking patterns on the screen. ~~by particular~~ level in ~~area~~ for

188 Q. How did you contemplate that that would be done?

A. ^{Some of} ~~From~~ the output from those oscillators would be wave-shaped ~~some~~ to form a video signal, and, again, summed with ~~some were~~ vertical and horizontal sync signals and applied to the TV set either by an R.F. link or videotape, if direct access ^{were} ~~was~~ available.

189 Q. Did you contemplate that this game would be played competitively between two or more players?

A. I don't believe I thought that through in that detail at that point.

190 Q. Did you ever carry this idea forward in actuality and actually produce apparatus for playing it?

A. No, we did not.

191 Q. Would you now read paragraph D of Section 2 on page 9-32?

A. "D. Instructional games designed to teach basics of geometry, basic arithmetic (adding blocks.)"

192 Q. Would you explain what you had in mind on September 1, 1966, when you made that entry?

A. Yes. The use of elementary symbols such as rectangles and visually stacking them as small children might stack blocks to learn how to count.

193 Q. Did you have any particular age level in mind for

that specific exercise?

A. Obviously, I must guess now, but pre-schoolers.

Q. My wife teaches nursery school.

Q. How did you contemplate that this activity would be carried out?

A. I think I just said that, Mr. Welsh, by putting on the screen rectangular symbols and stacking them as you might stack wooden blocks.

Q. How many such symbols did you contemplate?

A. I am sure I did not have a specific number in mind when I wrote that.

Q. What did you contemplate a participant would do, if anything?

A. Manipulate hand controls to bring symbols on the screen into some desired relation, spacial relation with one another, such as placing one on top of another.

Q. Did you ever carry this idea forward to the extent of providing some means for playing such an instructional game?

A. Yes. The Odyssey equipment which is Magnavox's product has been used in a nursery school environment for essentially that purpose, also, for the added

advantage of improving the kids' manipulative skills, coordination. ~~These figures such as rectangles on~~

198 Q. I believe I asked if you carried the idea forward?

A. Well, indirectly, certainly. I'm sorry, Mr. Welsh.
In hardware?

199 Q. Yes.

A. Yes, in a sense that that sort of thing was clearly doable with any of the machines we built; they ~~generated~~ generated rectangles on the screen which were ~~the~~ manipulated by hand. ~~spots to be~~ ~~manipulated~~ in either

200 Q. And in the machines that you built, how many rectangles were generated? ~~generally~~ that you built

A. Generally two. Excuse me. Two symbols which were manipulatable by hand controls.

201 Q. In that case, if you have only two, you can only stack one on top of the other and then you are finished, is that correct? ~~of the spot was~~

A. A Very elementary arithmetic lesson.

202 Q. Did you contemplate any other activity than that about which you have just told us at the time you made this entry under Section D of Section 2 on page 9.3? ~~(whereupon, at 1:03 o'clock,~~

A. Well, yes, the word geometry triggers the recollection

that I was contemplating stretching the length or height of geometric figures such as rectangles on the screen to teach the difference between squares, rectangles.

203 Q. Did you actually carry that idea forward into apparatus for accomplishing it?

A. Yes, again, in a sense that that was doable with all the equipment we built since all of them had adjustable height and width controls for symbology on the screens allowing the spots to be ^{stretched} directed in either direction.

204 Q. Was it contemplated on the apparatus that you built that the player, himself, vary those height and width controls?

A. No, it was not.

205 Q. Then you didn't build any games or apparatus by which the height or width of the spot was intended to be varied by the player?

A. No, we did not.

MR. WELSH: Off the record.

(Discussion off the record.)

(Whereupon, at 12:00 o'clock, noon, a recess for lunch was taken.)

AFTER LUNCH 1:00 P. M.

206 Q. (By Mr. Welsh.) Turning now, Mr. Baer, to Section E of Section 2 on pages 9-3 and 9-4 of the document before you, would you read that entry, please?

A. Yes. "E. Board chance games: That's classes of games imitative of board games usually employing dice, roulette wheels, etc., to determine character of next move."

207 Q. Would you describe how as of 1 September, 1966, when this entry was made on that document you contemplated playing dice games?

A. A concept was to use symbols on the screen as the moving chips as you might move chips on a cardboard game step by step or ^{an} ~~in~~ increased amount of two or three or four steps, in response to the throw of ~~/~~ dice. To initiate the move, actual dice or roulette wheels or model roulette wheels, toy roulette wheels were conceived as the determining element as to how far, what direction, in what way the spots on the screen were to be moved.

208 Q. Do I understand correctly, then, that the images you

Contemplated on the screen were spots? ^{YES}

A. Symbols, rectangles, spots.

Q. Did you contemplate simulating a board on the screen?

A. No.

Q. What did you contemplate to represent the board on which the spots were to be moved?

A. Well, to the best of my recollection, I thought that the equivalent of board games in transparent form could be stuck up as overlays on the screen so that you could move the electronic chips much as you would mechanical ones on a cardboard home-type game.

Q. Did you have any particular number of spots in mind with respect to this type of game?

A. No, sir. It, so I don't know.

(Discussion off the record.)

Q. (By Mr. Welsh.) Turning now to Section F on page 9-4 of Section 2 which started on page 9-3 of your original written -- or your earliest written document relating to your TV game idea, what does that section state?

A. Section F says, "Card games: games imitative of non card games requiring intellectual skill or dexterity."

Such games might be played with accompanied ^{ying} cards which player inserts into generator."

13 Q. Could you tell us how as of that date of September 1, 1966, you contemplated that such games would be played using a television receiver?

A. No, I can't, Mr. Welsh. Too many variations on them have developed over the years crowding out what I was thinking then.

14 Q. With respect to the board games under Section 2E, were there any particular board games that you had in mind of imitating?

A. Typical board game would be Monopoly, for example.

15 Q. How about Parcheesi?

A. I have a Parcheesi game at home, but I have never played it, so I don't know.

16 Q. Well, in Monopoly you have, do you not, or the game of Monopoly, does it not consist of a board with a path for moveable objects around the edge of the board?

A. Yes.

17 Q. And each player has one such object which is moved the number of spaces that are determined by a random selection of a number as by dice?

A. That's right.

18 Q. Other than providing the board in a different location and substituting an image on a screen for the moveable object, did you contemplate that that type of game had any other differences over the game it was expected to imitate?

A. No, only in a sense that people are fascinated by their ability to effectively remotely control the motion of something, in this case a spot on a screen, and that lends an element to what otherwise is a fairly trivial repetition of existing games.

19 Q. Would you now read Section G on page 9-4 of Section 2 beginning on page 9-3?

A. Section G says, "Game monitoring: players communicate with TV set while playing standard games (cards, skill, etc.) for the purpose of entering score into generator and displaying it on TV set. Generator may have provisions to provide simple arithmetic operations such as adding a player's scored points.

20 Q. What did you mean by the term generator there?

A. The hardware which together forms a TV game hardware which in this case is to be connected to the TV set to transmit to it some symbology for the purpose of

playing games. The record, however, dates back

Q. The generation, then, contemplated all of the hardware exteriorly?

A. No, I am wrong, Mr. Welsh. Let me re-read this. And Mr. Welsh, my initial statement is correct. By generator I meant the exterior hardware connected to the TV set. That's, really, what it is: ~~is a~~ A generator signal.

Q. Do I understand correctly, then, that the game monitoring described in this section contemplated the player's playing a game exteriorly of the television receiver and game hardware, but using that simply as a scoring means in place of, say, a pad of paper and a pencil?

A. That's correct.

Q. Turning now to Section H on page 9-4, would you read that, please?

A. "H. Sports games such as auto racing, racing using screen as roadway or obstacle course, or target shooting using screen as target."

Q. Would you tell us what you contemplated that the game of auto racing would consist of, that is, your contemplation as of September 1, 1966?

A. I have no trouble recalling that. That dates back to a game I built as a kid in which a roadway (in earlier years) on a scroll of paper snaked from left to right over the paper as the scroll was moved forward in a vertical plane, and the mechanical object depicting a car ^{was} moved laterally, transversely, across it from a little steering wheel to give the effect of driving a car over a moving roadway, and that's exactly what I had in mind when I wrote G. In this case, an outline of a roadway might be simply an unblank pulse drifting from left to right over a screen and therefore creating a snaking roadway to simulate the road, and the symbol on that roadway moving from left to right with hand controls ^{would} constitute the car.

225 Q. How did you contemplate producing unblanked pulse and causing it to drift back and forth?

A. Mr. Welsh, the word was unblank pulse or unblanking pulse, a noun.

226 Q. I'm sorry. (The running oscillator is right.)

A. Which is one way of saying that a rectangular pulse which raises the video level from black to white is created by any one of a score of standard circuits

and maintained for the duration during which you'd like to see a white line described on the screen and then return to black level. That's an unblank or unblanking pulse. It could be generated by ^aone [^]shot, multivibrator, by logic.

27 Q. Do I understand correctly, then, you contemplated a vertical line that was moved back and forth?

A. No, I contemplated at least two vertical lines that move back and forth to create roadway extremities and a symbol, probably, a rectangle would be the simplest possible symbol, which would represent the car.

28 Q. So, what you contemplated the player to see was two vertical lines that defined the roadway, and those were shiftable left and right to the screen?

A. They were. They would shift on the screen, but, would not be shifted by the player. They would have to be shifted by circuitry. In fact, very clearly I remember this is another instance where you want a free running oscillator slightly different from horizontal rate to provide the slightly out of sync drifting motion which gives you the effect of a snaking roadway.

(Discussion off the record.)

Q.

(By Mr. Welsh.) All right. I don't believe I understand yet. You get a snaking roadway rather than two vertical lines that are shifted back and forth?

A.

Right. Let me draw you a mental schematic. If you were to generate a rectangular wave form, say, thirty microseconds wide and started that wave form ten microseconds after the beginning of a horizontal sync pulse, you would unblank the screen roughly one-fifth of the way from the left-hand side, keep it unblanked for six-tenths of the screen width, and then blank it again. You would now have a ^{white} ~~wide~~ line that's one-fifth from one edge and -- what did I say -- and another fifth away from the other edge. In fact, it would be centered. Now, if you change the time of that such that it was closer to horizontal sync, that white line would now shift to the left towards horizontal sync. If you shorten that still more, it would drift over still more. Changing the occurrence of the pulse can be accomplished by changing the frequency of a free-running oscillator, if ^{the} ~~a~~ free-running

oscillator ran at exactly horizontal frequency and it started arbitrarily ten per cent from horizontal sync and it had an output pulse of the width that we just used in the example, you would see what I just described. If it then drifted by itself because it is not a stable oscillator in time with respect to horizontal sync, that line would certainly also fold over if it drifted past horizontal sync. Now, you can either allow a circuit to drift which may not produce the desired results or you can get more sophisticated and drive that with a ^{waveform} ~~reform~~ generator to produce prescribed precise undulations of the roadway. Remember, now, if you make this --, I think I see where your problem is -- if you make these shifts in frequency rapidly enough, that is within the period of one field, then you can get this line to start anywhere, and that's how you get the effect of two continuous outlines or a continuous band of white representing the roadway which snakes, as I described it, over the screen.

Q. That was going to be my question, if you did effect the change within a single field?

A. Yes, it has to, otherwise, it doesn't snake.

Q. Have you ever tried this?

A. Yes. Besides, it is currently being done on many machines.

Q. All right. Don't you have to repeat that signal in successive field in order to have the picture? In other words, there's persistence, is there not, in the screen?

A. You are right. You caught me in an error. You cannot have changes within one field, the change in position --

Q. Did you say you've actually done this?

A. Well, we have produced undulating roadways many times, but I obviously am mistaken in my recollection of how we did it.

Q. When did you do that?

A. Various times. I believe we'll come across it as we

go through the various documents here. In fact, I am quite certain we'll come across it.

Q. Is that a feature of any of the models that have been produced here?

A. I don't recall. We'll have to wait until we go through them, Mr. Welsh. So that I don't look altogether stupid, may I add something to the record?

236
Q.

Surely.

A.

The effect of the undulating roadway can still be had in just the manner in which I described it, except you cannot have reverse twists. You can only have, in effect, diagonal edges on the roadway on the screen.

237
Q.

In other words, straight lines?

A.

Straight lines, constant delays, and the drifts from side to side would have to be of the order of many fields, many frames, for the motion to look smooth, not to be chopped up, ^{this} It is really the only difference between what I initially visualized when we talked about it. It cannot be curved outlines. They've got to be straight.

238
Q.

And in the instances where you actually produced such images, were they curved or straight outlines?

A.

It would have had to be straight, but I think the effect, the visual effect, is one of curves, because the undulation in terms of your persistence of vision and your subjective reaction is still fairly rapid, and I think you get the effect of curving undulating lines. But on a frame by frame basis, the lines would have to be straight. If you were able to

freeze the frame, you would be able to see the line was straight, only slightly curved.

Q. In those instances where this was done, did you actually do it yourself?

A. I can only respond to that by saying that all the lab activity which resulted in hardware was directly supervised by me, and I interjected myself at times, and other times our technicians or engineers, Mr. Harris and Mr. Rush did the work themselves, but we had daily contact. I have a problem recalling what I did. It is because some nine and a half years have passed.

Q. I understand. On the racing game as you contemplated it, was the snaking roadway, which I believe you stated was not under the control of the player, was there anything which was under the control of the player?

A. Yes, the lateral position of the symbol on the screen which represented the car.

Q. And what was the player able to do with respect to the car?

A. He was able to translate or move the symbol from left to right and right to left by turning a control

knob. ~~When I hit the edge of~~ ~~the screen~~, what was on my mind was,

Q. How did the game appear to the player as it was being played?

A. As a white unblank^{ed} roadway effectively scrolling from top to bottom on the screen with a superimposed rectangle representing the car somewhere within the confines of that roadway moving from side to side in response to the turning of the control knob. ~~on the~~

Q. How could you determine -- how did the player determine whether he was playing the game properly?

A. Well, here I have problems in terms of timing. ~~When~~

Certainly, somewhere down the street we began to make the fact that the player and the roadway were coincident and the logic ^{-derived} arrived signal which the indicated that the coincident^{ce} had taken place, as the determining elements which did something, ~~r.~~

either ring up a score or blank the car temporarily, which was a typical thing we did initially in games to indicate that something not had happened. ~~I have~~ That was somewhere down the line?

Q. Somewhere down the line, I am sure. I have not

A. thought that through here. ~~on one does. I~~ ~~one drives a~~

As of September 1, 1966?

Q.

A. No. Thinking about it more, what was on my mind was, probably, exactly what I did with my paper and mechanical model. Watch! When I hit the edge of the road, you know, that indicated I was driving poorly.

246 Q. Was the spot unblanked, too?

A. Yes.

247 Q. Was the obstacle course you noted in this Section 2H under sports games similar to the roadway auto racing game?

A. I don't recall. My guess would be that the concept of putting obstacles on it which the car might strike with additional circuitry must have occurred to me, because that's precisely what I did on the paper racing game where I placed pencilled obstacles in the way to make the driving a little harder.

248 Q. In your paper scroll game, how old were you when you built that?

A. I went to work when I was fourteen, so it must have preceded that.

249 Q. Did you play it alone or with someone?

A. No, it was definitely a one on one game. One drives a car by oneself.

250

Q.

Section 2H also refers to target shooting using a red screen as target. What did you contemplate that that game would consist of?

A.

I don't really know whether at that point it was clear that we could use a spot on screen as a target spot, which is what we did somewhat later. Whether some other concept was in my mind I can't remember. Subsequently, of course, we used unblanked spots as targets at which we point photo-sensitive guns, rifles.

251

Q.

Now, turning now to page 9.5 or 9-5 -- excuse me -- would you read what you wrote in the first paragraph under the section marked 3?

A.

"Prior to the practical implementation of the above-mentioned approaches to TV gaming, the following conceptual ideas have been formulated and are here recorded to show the extent of the possible combinations and permutations which are presently apparent and to form a basis for possible patent (protective) action. It is planned to follow ^{these} ~~this~~ conceptual ^{ideas} ~~ity~~ in depth by corporately financed experimental work in the immediate future. Such work will be carried on in the company's facility at

Nashua, New Hampshire, and will be properly guarded against inadvertent disclosure by confining it to a minimum of personnel and by conducting the work in a guarded and otherwise inaccessible room. The following is a list of conceptual ideas and techniques which have occurred to the writer. It is intended to supplement this list with new material as it is formulated by adding new depositions (sheets) appropriately dated to this present material. No special order will be followed. However, each conceptual scheme will be accompanied as to gaming category by appending to it a letter corresponding to (class) letter of Section 2, pages 1 and 2a above."

252 Q. Could you go on? There is then a section 3.1, and could you tell us how that number is related to the last sentence that you just read?

A. Well, since I haven't read it yet

253 Q. No, the last. You just finished a sentence.

A. You mean 3-1.

254 Q. Yes, the 1st.

A. Well, 3-1 is a subheading of 3. In military

nomenclature, sequential subheadings treated in this

way, 3-1, would be a sub of 3. 3-11 would be a sub of 3-1. 3-111 would be a sub of 3-11, so I used the military nomenclature here to -- it is intended to be a subparagraph of the previous one. How it is I don't know until I read it. Is that correct?

Q. Very well. Would you read it then?

A. All right. "An oscillator centered at 3.579545 megacycles or approximately 3.58 megacycles is provided with a phase shift control in its output which is capable of producing a signal displaced from a basic 3.58 megacycle output pulse over a range of zero degrees up to 360 degrees. Purpose: to develop single color flat field on TV screen. Applications: A. ^{Connect a} ~~Correct~~ shift of phase shift ~~the~~ control to fly wheel. Players spin fly wheel. Player scores if fly wheel comes to rest in on player's pre-selected color on the C.R.T. screen. E, H: Manual skill required to position phase shift control so as to position desired color." End of 3-1.

Q. Now, the last sentence of the second paragraph under Section 3 stated each conceptual scheme will be coded as to gaming category by appending to

it a letter corresponding to "class" letter of Section 2, pages 1 and 2 above. Are there such class letters indicated with respect to paragraph 3.1?

A. Yes, the letters E and H are meant to be a bucket --

Q. And E is the board chance games, is that correct?

A. That's correct. water in the bucket -- signated with

Q. And H is sports games? ... of the way up from the

A. That's correct.

Q. Was this concept of 3.1 ever actually tried?

A. I believe so, but I think we'll have to wait until we see the hardware and the description in Harrison's books and other notes to refresh my memory.

Q. Was there contemplated there any other participation by the player than picking a color and spinning the white fly wheel? while he's playing against a timer

A. No, not at this point, you indicated this morning.

Q. Would you read the next section, 3.2?

A. "3.2. Two players operate a pump. One pumps up; one pumps down. 3.58 megacycle pulses plus phase

shifted chromapulses are generated. Pump controls level of chromasignal. One player pumps for black, other pumps for saturated color. Alternate for monochrome. Players pump for black or white

*

*

screen." The two code letters A and H are inserted here. "Use C.R.T. overlay showing section of vessel being filled." Next to the word filled is a small sketch of a rectangle meant to be a bucket -- it probably does not show on your Xerox copy -- with a level of the water in the bucket designated with a little line going a third of the way up from the bottom.

Q. You are correct. It does not show on my Xerox copy. Was apparatus for playing the game described in paragraph 3.2 subsequently constructed?

A. Yes, it was.

Q. That was apparatus where there were two players?

A. No. You will see a game in which one player pumps water up a hose while he's playing against a timer in the chassis which you inspected this morning.

Q. How as of September 1, 1966, did you contemplate that a player would operate, or as you put it here, one pumps. How did you contemplate the player would pump?

A. I can't tell you what I thought of on 1 September, '66, because, subsequently, we built hardware and did all this. I don't know whether that hardware

corresponds^{to,} or was an iteration of what I originally started out with.

265

Q. Did you on 1 September, '66, contemplate hardware or was this simply a listing of an idea that you contemplated might be feasible?

A. No. In all modesty I don't think that way. When I have ideas, they are generally accompanied, at least, by mental images of ^{discrete} discreet circuitry that could implement that function which I am thinking of. That isn't universally true, but it is generally how I think, so I can only assume that I thought of some of the ways which several weeks later were implemented in real hardware at that time.

SOS

EAS

266

Q. Going on to Section 3.3, would you read what you entered there?

A. "3.3. Bar, line, or dot generation: players control selective blanking, blinking, color coding of lines, bars, dots, fields via generator," and then follow the code letters W, C, D and E.

SOS

267

Q. And those code letters relate to board skill games, artistic games, instructional games, and board chance games, is that correct?

A.

That is right.

268 Q. Did you draw a distinction between bar and line?

A. Yes.

269 Q. What did you consider to be a bar and what did you consider to be a line?

A. A bar has some finite width greater than a spot size, and a line would have -- a line, in essence, is a very narrow bar, its lower limit by a bar one spot size in height.

270 Q. How did you contemplate either a bar or a line would appear on the screen of the TV receiver?

A. A bar or a line is simply an unblank pulse repeated for every line, every horizontal line of a field with the same timing relationship to horizontal sync from line to line, ^{if} you wish to describe a vertical line. A horizontal line would be one in which a portion or all of a horizontal line is unblanked, and any combination in between would have to be something like a bit more complicated.

271 Q. So you contemplated either vertical line formed of recurring single pulses and a horizontal, either single horizontal line, which would be a line or plurality of them which would be a bar? That's right. Well, the plurality of them so close.

A.

together they form a continuous shade of white level or gray level as to be considered a continuous bar.

272

Q. And how about the dot generation?

A. Dot, right from the start, was our choice of word for a symbol, because the simplest symbol is a dot or a rectangle or a square. In retrospect, it may be a poor word.

273

Q. You say it was our choice?

A. Well, my choice, and it came to be ^{the} usage of the group consisting of ^{RUSCH,} ~~Rush~~, Harrison and myself.

274

Q. Did you select that term after consultation?

A. No, I think it was born somewhere in here, because I do talk about -- yes -- dot generation here, and I talk about dots, so it is fair to say these words were generated at this time. We continued to use them.

275

Q. Did you discuss with Harrison and ^{RUSCH} ~~Rush~~ at any later time as to whether it was a proper, right term or not?

A. No. It didn't occur to us to worry about semantics.

276

Q. Did you just say that you thought it was a poor choice?

A. Yes, I did, because a spot, by dictionary definition, is a small elemental area. I guess one could have a

very large spot. . . . of one bar, line or dot.

Q. Now, you are using the term spot. Do you mean the I was using, when I asked the question, I thought we were discussing the term dot. . . . at that time had

A. I may have been confused, but we used the two, we both terms interchangeably. . . . for that reason as in

any other project. MR. WELSH: Let's take a couple minutes now, to Section 3.4, would you read that,

(Whereupon, at 2:15 o'clock, P.M., a short recess was taken.)

geometric patterns . . . lines, bars, dots, etc., to form characteristic displays of color distribution, brightness distribution. Variations may be --

AFTER RECESS - 2:20 P. M. . . . blanking, etc., as an . . . above or by controlling spectral

(By Mr. Welsh.) With respect to the bar, line, and dot generation referred to in Section 3.3, did you contemplate any particular number of bars? . . . followed by

No, sir. . . .

Q. Or any particular number of lines? . . . noise into the

A. No, sir. . . . produced

Q. Any particular number of dots? . . . all time that we

A. No, sir. . . . made of a series of neon

281 Q. Did you contemplate more than one bar, line or dot?

A. Yes, I think at the time this was written what was technically doable and economically possible was undetermined, so I could not have at that time had any specific ideas on how many things could have been put up on a screen simply for that reason as in any other project. Display bars.

282 Q. Going, now, to Section 3.4, would you read that, please? Generation of voltage levels.

A. "Noise injection in combination with colored geometric patterns, such as lines, bars, dots, etc., to form characteristic displays of color distribution, brightness distribution. Variations may be -- the missing word -- the result of selective blanking, etc., as in 3-2 above or by controlling spectral content distribution band width of noise. Noise may be modulated onto 3.58 megacycle carrier used as substitute for chroma signal, etc.," followed by the code letters A, B and H.

283 Q. Have you subsequent to this injected noise into the games which were produced?

A. Yes. Somewhere in the record we'll find that we used a noise generator made of a series of neon

bulbs as an input device or a wave form generator to move spots around the screen. We'll see that sometime later as we go through the material. I believe the hardware is also -- yes, I know the hardware is in this room. ... moving dots,

284 Q. There, then, was actual hardware built? ...

A. Yes, yes, it is on display here. ...

285 Q. When you use the term noise, what did you mean?

A. Random generation of voltage levels. ... in

286 Q. You did not mean sound, then, I take it? ...

A. No, I did not mean acoustic noise. I meant electrical noise. ... successively

287 Q. Would you go on to Section 3.5 and read that for us, please? ... it would come out as

A. All right. Scan conversion techniques using horizontal mechanically vibrating or rotating devices, such as spinning, Nipcov disc in the generator. The player can enter data (color, brightness, dots, squares, circles, other geometric figures) by placing sensor (photo cell, capacitative pick-off, magnetic pick-off, electric contact, etc.) over a spinning, Nipcov disc, or similar device. Multiple pick-offs for had several players may be used. ... function of

288

Q.

Could you explain what you contemplated by that entry?

A.

In general, I intended to generate wave forms suitable for unblanking purposes or for color change for initiating color changes, or for moving dots, squares, circles, dots and squares by using electro-mechanical means for generating these wave forms. A Nipcov disc, you might remember, is one of the earliest forms of Raster scan generating devices in which a series of pinholes located radially on a disc displaced from one another at regular intervals scan out a succession of physical ^{traces} shapes successively, one below the other in space so that if you projected a light spot through that area, it would come out as a flying spot on the other side describing horizontal lines in succession. It is a mechanical TV system dating back to a Russian inventor by the name of Nipcov sometime in the 1880's, but it is still a legitimate way of developing recurrent wave forms. ^{Put} But the source of light on one side of a disc, photo cell on the other side, and out come voltages which are responsive to the number of holes you had. How fast you spun the disc may be a function of

whether the disc is spinning at regular rotary rates or is reciprocating. Let your imagination play.

289

Q.

Subsequent to the date when you made this entry on September 1, 1966, did you actually implement this scan conversion technique that you described?

A.

Again, Mr. Welsh, I think we'll have to wait until we go through the record of some of the early experiments to see just which of these things were done. I don't remember.

290

Q.

Would you read paragraph 3.6, please?

A.

"3.6. Free running Raster techniques: generation of displays by providing only horizontal, only vertical, both or neither, ^{synchronization} ~~centralization~~ pulses to the TV set from the generator entering TV set only with either horizontal ^{sync} or vertical sync correlated signals or noise or totally uncorrelated noise using level blink rate itself as characteristic ^{tutor} (identifying display.)"

291

Q.

What did you contemplate that the player or operator of the television receiver would visualize with this free-running Raster technique?

A.

I do not recall, specifically, what I had in mind. The displays would be of the same nature as those

we discussed earlier when we talked about figures and random lines.

292 Q. Did you contemplate that the player or operator of the television receiver would participate in any way with respect to this type of technique?

A. I do not remember. It doesn't appear that way from what it says here.

293 Q. And how about the previous one of Section 3.5?

A. No, I believe that was meant as a technique for inputting machine-generated functions which would aid in the game somehow. Is that clear?

294 Q. Well, I am not sure I understand how it might aid in a game.

A. Well, may I illustrate?

295 Q. Surely.

A. By that I mean that, to go back to the automobile racing example, that you might want a generator that moves the roadway from side to side in some prescribed rhythmic pattern. That would be a machine-aided or machine-generated wave form which is used to aid the player in executing an enjoyable game, because it moves the roadway for him. It employs the element of surprise. Mechanical movement of a

296 Q.

Did you contemplate any storage in the provision of such signals to produce these effects?

A.

No, the mention -- yes and no. The mention of noise indicates that I intended noise to provide that function. We went through that in 3.4 above. Noise is sort of an un-preprogrammed sort of voltages which happen in random fashion, and if they are ^{constrained} ~~contained~~ in level ^{and} band width, they are likely to yield a random output that's usable for symbology on screen and its position on screen, so in a sense it is a form of storage, though nothing is stored there unless you consider the movement of atoms and electrons which produce a noise in the first place ^a ~~to~~ form ^{of} ~~a~~ storage.

297 Q.

You referred to that noise as non-preprogrammed. Did you contemplate any preprogrammed?

A.

Yes. The Nipcov disc, for example, which we went through in the previous paragraph, is a form of pre-programmed ^{waveform} ~~reform~~ generation deliberately set out to create a wave form that enables you to move a spot from left to right, or right to left ^{and} reciprocated. You can do that by appropriate patterns. That contemplated actual mechanical movement of a

298 Q.

perforated disc?

A. Right, probably motor driven or, maybe, spun by one of the participants of the game which is suggested somewhere in the notes. I suggested blowing at it with a straw.

299 Q. Did you contemplate any electrical means of pre-programming?

A. Yes. Excuse me, preprogramming? Not at the time.

300 Q. Did you subsequently?

A. Yes.

301 Q. Was that involved in any of the work leading to the applications for the patents?

A. No, ~~naturally~~. not really. *

302 Q. Is there any other written information contained on those pages 9-3 through 9-10 of the earliest document referring to your TV game idea?

A. On page 9-7 the words "Witnessed and understood" in the upper left-hand corner, "R. H. Baer, 1 September, '66" are located, and a diagonal line is drawn through the page and all subsequent pages are simply slash line^d with no further written material on them. *

303 Q. Now, after you prepared this document and presented it to Mr. Solomon and he signed it with the first

four pages on -- strike that.

Before going on, referring back to paragraph 3.5, which was the scan conversion techniques, the section using the Nipkov disc, what type of signal did you -- or did you obtain an electric signal which occurred upon spinning of the disc?

A. Yes.

Q. And what was the form of that signal?

A. A voltage level, ^a wave form.

Q. An output of a photo cell?

A. Yes.

Q. What means was used to enable the television receiver to respond to that signal or was contemplated?

A. Well, it was -- the TV set did not respond directly to that wave form. That wave form caused some effect in the display on the TV set or was contemplated to cause some effect such as the motion of rectangle or a change in color at a rate corresponding (or a level corresponding) to the wave form generated by the Nipkov disc. In that sense it caused a change on the TV set.

MR. WELSH: Would you read that

answer back, please? ... in the file

(The last answer was read back by the reporter.)

Q. (By Mr. Welsh.) When you wrote this section, 3,5, on page 9-6, did you have in mind any particular means for using the wave form resulting from spinning the Nipcov disc to produce the effects on the television screen which you just described?

A. Probably not, because at that moment specifications were not clear yet, but it is clear that I intended a voltage output ^{for use} by some voltage sensitive circuit.

Q. After you prepared these pages, 9-2 through 9-10, and Mr. Solomon signed them, the first four pages, what did you do with this document?

A. It remained in my file for several months while the experimental work started.

Q. Referring to Exhibit 9 from which this document, pages 9-2 through 9-10, was taken which bears the legend "T. V. Game Data in Chronological Order," what is the next document which appears in that file?

A. I would have to look at the file.

Q. Would you do that, please?

A. Mr. Welsh, the next document that appears in the file is a schematic dated 12/10/66. However, may I ask whether it is your intention to go through documents chronologically, because that is not the next document. you find it

310 Q. Well -- to get the next document in the file.

A. In spite of what the cover may say.

311 Q. I see. Well, I did want to find out what happened, next, and I thought --

A. In that case, you are going to have to go to the blue book, which is book No. 1. May I open it?

312 Q. Sure. (Document handed to the witness by Mr. Welsh.)

(Document handed to the witness by Mr. Welsh.) THE WITNESS: Your exhibit No. 60, and I believe you'll find -- yes, here it is -- a page which you labeled 16-4A dated 6 September, 1966, with a title T. V. Mode Data Entry Device which, incidentally, was also countersigned by Mr. Solomon on 6 September, 1966. That is the first sketch which we were able to recover out of the records depicting TV game hardware. There were more than once (By Mr. Welsh). Where did you find that document?

Q.

A. It was with the notes which I had kept, the original notes which I had kept, including the document 9-2 through 9-10 which we just finished discussing.

314 Q. When did you find it?

A. It was together all the time. It was never lost.

315 Q. With the documents 9-2 through 9-10?

A. Right.

316 Q. Where is it located now?

A. I stapled it to the page No. 4 of Exhibit 16 because the first pages of Exhibit 16 are handwritten replica of copy of 9-2 through 9-10 in Mr. Harrison's handwriting who copied my original notes for his benefit, and edification when he was first brought onto the job. So somewhere during my attempt to organize papers I placed that here. I might as well have kept it with this, but I had possession of this blue book for many years.

317 Q. You mean when you attempted to organize papers you mean at that time you collected these items 1 through 8?

A. I don't really know, but somewhere along the line. I organized and collected papers more than once over the course of the years. All I know is I had it.

this and this and the blue book in my possession for many, many years.

318 Q. You mean Exhibit 16-4?

A. And Exhibit 9-2 through 9-10 and the piece of paper we're looking at now labeled 16-4A.

319 Q. I wonder why you attached Exhibit 16-4A to that book and did not also attach pages 9-2 through 9-10.

A. Pages 9-2 through 9-10 are represented by this handwritten copy of these pages. This is a handwritten copy by Mr. Harrison word for word of what's in here.

320 Q. And do you know when he made that copy?

A. Only by inference in that the activity picked up in -- just a minute. Let me look through the book, please. Yes, only by inference to the date of page 21 in Mr. Harrison's handwriting, and next to his signature, 5/4/67.

321 Q. It was about that time that he made the entries?

A. That he came onto the job, and he made the entries so as to acquaint himself with what I had been thinking and what I was about to do.

322 Q. So he copied your original notes of pages 9-2 through 9-10?

A. Yes, he did that because he can't read my handwriting.

323 Q.

On pages 1 through -- which is the proper way to do

A.

No, pages 1 through 4.

324 Q.

Of Exhibit 16? ... of activity that your

A.

16, that's correct. accustomed to engage in

325 Q.

So you must have attached Exhibit 16-4A, stapled it to page 4, sometime after?

A.

Sometime later. some authority now to initiate

326 Q.

So it would have been after May, 1966. I mean '67.

A.

That's correct. initiation today. I do not have

327 Q.

In September, 1966, did you have authority to initiate projects at Sanders?

A.

Yes, I did. last time you communicated with Mr.

328 Q.

What was that authority?

A.

I, if ^{you} recall, was ^a division manager, and I had ~~ers~~. substantial discretionary authority to use overhead funds in ways which were in the best interest of the company, in my judgment.

329 Q.

Did you contemplate using overhead funds for the TV game project? ... about a year ago, you say.

A.

For the initial exploration of whether the scheme was feasible, yes. Although, I recognized then that just as soon as I thought the concept was sound enough, I would go to the IRD office and look for

some official funding, which is the proper way to do it. ~~at that time~~

Q.

Was TV games the type of activity that your ~~division~~ division had been accustomed to engage in? ~~initiation~~

A.

No, sir, totally ~~strange~~ ^sstrange to my everyday activity ~~for~~ and that of the division.

Q.

Do you have the same authority now to initiate ~~passed~~ projects that you had in September of 1966?

A.

I can request the initiation today. I do not have funds available which I can dispose of in a discretionary fashion, no.

Q.

When's the last time you communicated with Mr. Solomon?

A.

Possibly a year ago, shortly after he left Sanders. When he became very ill I visited him in the hospital.

Q.

How old is he?

A.

I would have to guess, Mr. Welsh. Mid-forties.

Q.

So you saw him about a year ago, you say?

A.

Yes.

Q.

That was after the lawsuits were filed?

A.

I suppose it would have to be.

Q.

Did you discuss the lawsuits with him --

337 A. No, sir.

Q. -- at that time?

A. Furthermore, he was in no shape to discuss anything with anybody. He has a very bad diabetic condition, and he broke a leg skiing. He was a ski instructor at a near-by slope and had had some very severe reactions to the accident and was in a very depressed state.

338 Q. You did not see him since then? You have not seen him?

A. No. In fact, I have a guilty conscience on the subject.

MR. WELSH: Off the record.

(Discussion off the record.)

MR. WELSH: We'll now adjourn this deposition with a tentative date, subject to agreement of the parties, to resume on January 6, 1976, here at Sanders Associates. Do you have anything else at this time, Mr. Williams?

MR. WILLIAMS: No, I have nothing.

MR. WELSH: O. K. Thank you very

much, Mr. Baer.

Ralph H. Baer
Deponent

THE STATE OF *N.H.*
COUNTY OF *Hillsborough*) ss.

Subscribed and sworn to before me this 10th
day of May, 19 76.

Marilyn E. Trapalis
~~Justice of the Peace and/or~~
Notary Public

Marilyn E. Trapalis
Notary Public
My Commission Expires March 19, 1980